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I. SOME NEW OR UNRECORDED COMPOSITAE CHIEFLY OF NORTHEASTERN AMERICA.

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DURING the past decade the large collections accumulated at the Gray Herbarium of plants from various districts of Northeastern America have contained many species unlike those ordinarily recognized in the region. Among these are numerous members of difficult genera of the *Compositae* which have from year to year been held over for further field-observation or close study. In attempting to label this accumulated material in some of the genera it has been necessary to characterize some of the plants as new, while some species heretofore considered as restricted to Northwestern America have been found to have abundant representation in the Northeast. The novelties in such genera as have been recently worked over are discussed below.

SOLIDAGO HISPIDA Muhl., as it occurs in northern New England, is a tolerably uniform plant, characterized by its densely pilose stem, its leaves pubescent upon both surfaces and its virgate or paniculate inflorescence with the heads densely clustered in elongate or short racemes. In Newfoundland and eastern Canada the plant abounds but it there varies greatly and is represented not only by the typical *S. hispida* but by four well marked varieties. One of these, var. *lanata* (Hook.) Fernald, found in Newfoundland, the Gaspé Peninsula

of Quebec and northernmost Maine, as well as on the Saskatchewan Plains has been already characterized.¹ The others, which seem not to have been heretofore distinguished, are as follows: —

S. HISPIDA, var. **disjuncta**, n. var., caulibus gracilibus 0.7–2.5 dm. altis albido-tomentosis; foliis utrinque hispidulis, basilariis spathulato-oblongatis 1–2 cm. latis, caulinis 2–5 infra inflorescentiam basilariis similibus; panícula racemiformi subsimplici laxè cylindrica 3–15 cm. longa, pedicellis remotis 1–5-cephalis; involucre 5–6 mm. longo.

Stems slender, 0.7–2.5 dm. high, white-tomentose: leaves hispidulous on both surfaces; the basal spathulate-oblongate, 1–2 cm. wide; the cauline 2–5 below the inflorescence, similar to the basal: panicle racemiform, subsimple, loosely cylindrical, 3–15 cm. long; pedicels remote, 1–5-headed: involucre 5–6 mm. long. — NEWFOUNDLAND: calcareous cliffs, Steady Brook Falls, near mouth of the Humber River, July 16, 1910, *Fernald, Wiegand & Kittredge*, no. 4071 (TYPE in Gray Herb.). QUEBEC: calcareous cliffs, altitude 900–1125 m., Table-top Mountain, August 7, 1906, *Fernald & Collins*, no. 775; Montmorency Falls, August 4, 1902, *J. R. Churchill*.

S. HISPIDA, var. **tonsa**, n. var., caulibus glabris vel sparse puberulis; foliis glabris vel glabratis vel subtus ad nervos pilosis margine eciliatis vel sparse ciliatis, basilariis oblongatis vel anguste obovatis 1–2.5 cm. latis plerumque subacutis, caulinis 7–20 infra inflorescentiam basilariis similibus gradatim minoribus, superioribus 1–5 cm. longis 2–8 mm. latis; panícula thyrsiformi densa; involucre 3–5 mm. longo.

Stems glabrous or sparingly puberulent: leaves glabrous, subglabrate, or pilose on the nerves beneath, the margin without cilia or sparingly ciliate; the basal oblongate or narrowly obovate, 1–2.5 cm. wide, mostly subacute; the cauline 7–20 below the inflorescence, similar to the basal, gradually smaller; the upper 1–5 cm. long, 2–8 mm. wide: panicle thyrsiform, dense: involucre 3–5 mm. long. — NEWFOUNDLAND: serpentine tableland (altitude 550 m.) and slopes of Blomidon, August 21, 1910, *Fernald & Wiegand*, nos. 4074, 4075 (TYPE in Gray Herb.), 4076, 4077; heath on diorite tableland, alt. 380 m., Lookout Mountain, Bonne Bay, August 26, 1910, *Fernald, Wiegand & Kittredge*, no. 4079; barrens at base of serpentine tableland, Bonne Bay, August 27, 1910, *Fernald, Wiegand & Kittredge*, no. 4080. QUEBEC: Jupiter River, Anticosti, July 20, 1883, *J. Macoun*; Rivière du Loup, August, 1914, *Bro. Victorin*, no. 588. NEW BRUNSWICK: Nepisiguit Falls, August, 1873, *J. Fowler*.

In its most pronounced form closely simulating the southern *S. erecta* Pursh, but distinguished by its deep orange-yellow rays and by the greener involucre with fewer series of bracts.

S. HISPIDA, var. **arnoglossa**, n. var., caulibus crassis puberulis 2–3

¹ Hook. Fl. Bor.-Am. ii. 4 (1834); Fernald, RHODORA, x. 87 (1908).

dm. altis; foliis coriaceis supra glabris subtus sparse hirtellis, basilariis oblongo-obovatis 2.5–6 cm. latis apice rotundatis margine crenatis, caulinis 5–9 infra inflorescentiam basilariis similibus, superioribus 5–8 cm. longis 2–2.5 cm. latis; panicula thyrsiformi densa, racemis inferioribus foliis majus suffultis: involucre 4–5 mm. longo.

Stems stout, puberulent, 2–3 dm. high: leaves coriaceous, glabrous above, sparingly hirtellous beneath; the basal oblong-obovate, 2.5–6 cm. wide, rounded at apex, the margin crenate; cauline 5–9 below the inflorescence, similar to the basal; the upper 5–8 cm. long, 2–2.5 cm. wide: panicle thyrsiform, dense, the lower racemes subtended by large leaves: involucre 4–5 mm. long.—NEWFOUNDLAND: sea-cliffs, Apsey Beach, Bay of Islands, August 10, 1895, *Waghorne* (TYPE in Gray Herb.); open woods, Meadows, Bay of Islands, September 3, 1896, *Waghorne*. Fernald & Wiegand's no. 4078 from Bonne Bay is intermediate between vars. *arnoglossa* and *fallax*.

SOLIDAGO chlorolepis, n. sp., caulibus caespitosis gracilibus erectis vel decumbentibus 1–3 dm. altis glabris vel sparse puberulis; foliis coriaceis utrinque glabris, basilariis rosulatis spatulato-oblancheolatis apice rotundatis vel subtruncatis crenato-serratisque basi cuneato-petiolaris 2–6 cm. longis 0.6–1.3 cm. latis, caulinis remotis 3–8 infra inflorescentiam basilariis similibus; panicula racemiformi subsimplici laxe cylindrica 3.5–20 cm. longa 1.5–2 cm. diametro; pedicellis remotis monocephalis vel 2–4-cephalis valde adscendentibus 1–1.5 cm. longis hirtellis viscidis, inferioribus foliis lineari-oblancheolatis suffultis; involucre hemisphaerico 3–4 mm. alto viscido; bracteis 4–5-seriatis exterioribus crassis lanceolatis viridibus margine stramineis, interioribus stramineis apice viridibus; ligulis 15–20 circa 2 mm. longis, 0.7 mm. latis; achaeniis hispidis.

Stems caespitose, slender, erect or decumbent, 1–3 dm. high; glabrous or sparsely puberulent: leaves coriaceous, glabrous on both sides; the basal rosulate, spatulate-oblancheolate, rounded or subtruncate and crenate-serrate at apex, cuneate-petiolate at base, 2–6 cm. long, 0.6–1.3 cm. wide; cauline remote, 3–8 below the inflorescence, similar to the basal: panicle racemiform, subsimple, loosely cylindrical, 3.5–20 cm. long, 1.5–2 cm. in diameter; pedicels remote, monocephalous or 2–4-headed, strongly ascending, 1–1.5 cm. long, hirtellous and viscid, the lower subtended by linear-oblancheolate leaves: involucre hemispherical, 3–4 mm. high, viscid: the bracts 4–5-seriate; the outer thick, lanceolate, green; the median narrowly oblong, obtuse, green with stramineous margin; the inner stramineous with green tip: ligules 15–20, about 2 mm. long, 0.7 mm. wide: achenes hispid.—QUEBEC: serpentine barrens and brook-ravines, headwaters of Ruisseau au Diable, altitude 700–1000 m., Mt. Albert, August 12, 1905, *Collins & Fernald*, no. 140; crevices and talus of serpentine, gulch north of Lac au Diable, Mt. Albert, July 25, 1906, *Collins & Fernald*, no. 750 (TYPE in Gray Herb.).

Originally distributed as *S. decumbens* Greene, but differing from that common Rocky Mountain species in the greener foliage, the lower cauline more rounded or subtruncate; in the more interrupted simpler inflorescence with long-pedicelled and smaller heads; in the shorter deep green outer bracts of the involucre; and in the shorter ligules.

SOLIDAGO MULTIRADIATA Ait., var. **arctica** (DC.), n. comb. *S. Virgaurea* L. $\mu.$ *arctica* DC. Prod. v. 339 (1836).

Typical *S. multiradiata* Ait. Hort. Kew. iii. 218 (1789), originally described from Labrador, is known from Hudson Strait to Newfoundland, the Gaspé Peninsula, Quebec, and Kewatin; also in Alaska (Cape Nome, etc.) and on Nunivak Island. It has the cauline leaves comparatively short and reduced below the inflorescence to small or at least not conspicuous bracts. The var. *arctica* originally described by De Candolle from Unalaska and from St. Lawrence Bay (Bering Strait), has the leaves much more elongate, the upper usually equalling or overtopping the compact inflorescence. This plant has been examined from the following stations which indicate that it is the more characteristic phase of the species in the Aleutian and adjacent Islands. UNALASKA: without locality (*Langsdorff, Mertens, Dall, Harrington*); Dutch Harbor (*Van Dyke*, nos. 22, 196); Glacier River (*Van Dyke*, no. 141): POPOFF ISLANDS: Shumagin Islands (*Harrington*): BERING STRAIT (*C. Wright*).

SOLIDAGO mensalis, n. sp., caule solitario 2-3 dm. alto glabro superne piloso; foliis tenuibus glabris ciliolatis supra perviridibus subtus pallidis reticulato-venosisque, basilariis anguste ellipticis longe petiolatis lamina 3-4.5 cm. longa 1-2 cm. lata acuta margine serrato-dentatis, caulinis 9-13 infra inflorescentiam cuneato-oblongatis breviter acuminatis, imis subpetiolatis supra mediam serrato-dentatis, mediis superioribusque sessilibus subintegris vel integris 1.5-6 cm. longis 4-12 mm. latis; inflorescentia racemiformi subsimplici laxa 3-9 cm. longa, pedicellis 1-2 cm. longis pilosis adscendentibus remote bracteolatis; involucreo campanulato-hemisphaerico 7-10 mm. alto; bracteis 3-4-seriatis subaequalibus viridibus costa glutinosa, exterioribus perviridibus lanceolato-attenuatis ciliolatis, interioribus lineari-acuminatis margine pallidis; floribus circa 50, ligulis 15 circa 4 mm. longis; achaeniis maturis 4 mm. longis substrigosis.

Stem solitary, 2-3 dm. high, glabrous except for the pilose summit; leaves thin, glabrous, ciliate, deep green above, pale and reticulate-veiny beneath; the basal narrowly elliptic, long-petioled, the lamina

3–4.5 cm. long, 1–2 cm. wide, acute, with serrate-dentate margin; cauline 9–13 below the inflorescence, cuneate-oblongate, short-acuminate; the lower subpetiolate, serrate-dentate above the middle, the median and upper sessile, subentire or entire, 1.5–6 cm. long; 4–12 mm. wide: inflorescence racemiform, subsimple, loose, 3–9 cm. long; pedicels 1–2 cm. long, pilose, ascending, remotely bracteolate: involucre campanulate-hemispherical, 7–10 mm. high: bracts 3–4-seriate, subequal, green, the midrib glutinous; outer very green, lance-attenuate, ciliolate; the inner linear, acuminate, with pale margin: flowers about 50; ligules 15, about 4 mm. long: mature achenes 4 mm. long, somewhat strigose.—QUEBEC: calcareous north-facing cliffs at 900–1125 m. altitude, Table-top Mountain, Gaspé County, August 7, 1906, *Fernald & Collins*, no. 778 (TYPE in Gray Herbarium).

In its thin ciliolate leaves pale and conspicuously reticulate-veiny beneath and in the texture of the involucre bracts very near *S. multiradiata* Ait., but that species has very elongate oblongate basal leaves and essentially entire lower and median cauline ones, and a strongly corymbiform dense inflorescence of smaller heads, the involucre 5–6 mm. high and with less attenuate bracts.

SOLIDAGO **Klughii**, n. sp., glaberrima; caule gracile stricto 6 dm. alto maculato; foliis rigidis anguste linearibus subulato-attenuatis, imis in petiolum marginatum longe attenuatis, mediis 4–10 cm. longis 2–3 mm. latis; panicula virgata 1 dm. longa 1.5 cm. diametro; involucre 3–4 mm. longo; bracteis 3-seriatis, exterioribus mediisque lanceolatis acutis crassis costa viridi glutinosa, interioribus linearibus obtusis tenuibus stramineis ciliatis; ligulis 8–10.

Very smooth: stem slender, strict, 6 dm. high, mottled: leaves rigid, narrowly linear, subulate-attenuate; the lower narrowed into a long margined petiole; the median 4–10 cm. long, 2–3 mm. wide: panicle virgate, 1 dm. long, 1.5 cm. in diameter: involucre 3–4 mm. long: bracts 3-seriate, the exterior and median lanceolate, acute, thick, with green glutinous midrib; the interior linear, obtuse, thin, stramineous, ciliate: ligules 8–10.—ONTARIO: Oliphant, Bruce County, August 14, 1905, *A. B. Klugh*, no. 3 (TYPE in Gray Herb.).

A remarkable species, closely simulating the heretofore unique and very rare *S. Guiradonis* Gray of Fresno County, California. In habit, foliage and glutinous outer bracts of the involucre the two are inseparable; but *S. Guiradonis* has only two series of bracts, these all attenuate thick and glutinous, while *S. Klughii* has a third inner series of thin scarious obtuse bracts. *S. Klughii* is also notable as an addition to the flora of the Bruce Peninsula, long famous for its unique or isolated species.

SOLIDAGO HUMILIS Pursh. In 1908 the writer¹ pointed out that the type of *S. humilis* Pursh² is a Newfoundland plant in the Banksian Herbarium, which is quite unlike the species (*S. racemosa* Greene) with which it was long identified. In the discussion of *S. humilis* seven years ago the exact identity of Pursh's species was left unsettled, but the statement made that it was either *S. uliginosa* Nutt. or *S. uniligulata* (DC.) Porter. At the same time it was pointed out that, as soon as its exact application should be determined, the name *S. humilis* Pursh must be taken up for one or the other of the two later species; and that those authors who had set aside the name *S. humilis* Pursh (1814) on account of a supposed earlier "*S. humilis*" of Miller (1768) could not have verified their references, for Miller had published, not "*S. humilis*" but *S. humilius*,³ a name in the comparative degree (neuter) and certainly not the same name as *S. humilis*.

The recent collections from Newfoundland, Gaspé and the Labrador Peninsula have brought in a large number of sheets of *Solidago uliginosa* Nutt. Journ. Acad. Philad. vii. 101 (1834) and there is no question that the type of *S. humilis* Pursh is a small northern specimen of this species. It is perfectly matched in stature, habit, foliage, and even in the elongate leafy bract at the base of the slender interrupted thyrsus by such specimens as Spreadborough's no. 14324 from the Ungava River, Robinson & Schrenk's no. 210 from the Exploits River in Newfoundland, Fernald & Wiegand's no. 4098 from the shores of Ingornachoix Bay in Newfoundland, and Fernald & Collins's no. 768 from Table-top Mountain, Quebec. There is, then, no question that *S. humilis* Pursh (1814) is *S. uliginosa* Nutt. (1834). Although varying greatly in stature and in the size of the inflorescence *S. humilis* has the cauline leaves bluntly acuminate or at most acute, the rhachis and branches of the thyrsus at most short-hirtellous and the bracts of the involucre obtuse. About the ponds of the East Branch of the Humber in Newfoundland occurs a plant like *S. humilis* in habit and inflorescence but so far departing from it in details as to merit separation as

S. HUMILIS Pursh, var. **peracuta**, n. var., foliis caulinis serratis apice subulato-attenuatis; ramis hirsutis, pilis 0.5-1 mm. longis; involucri bracteis attenuatis.

Cauline leaves serrate, the apex subulate-attenuate; branches

¹ RHODORA, x. 88-90 (1908).

² Pursh Fl. 543 (1814).

³ Mill. Dict. ed. viii. no. 16 (1768).

hirsute with hairs 0.5–1 mm. long: bracts of the involucre attenuate.—
NEWFOUNDLAND: open rocky woods, Middle Birchy Pond, East
Branch of the Humber, July 13, 1910, *Fernald & Wiegand*, no. 4097
(TYPE in Gray Herb.).

SOLIDAGO UNILIGULATA (DC.) Porter, var. **levipes**, n. var., ramis
paniculae pedicellisue glabris vel glabratis glutinosisque.

Branches of the panicle and pedicels glabrous or glabrate and
glutinous.—NEW YORK: Penn Yan, *Sartwell* (TYPE in Gray Herb.);
Bergen Swamp, 1880, *C. H. Peck*. ONTARIO: Pt. Edward, River St.
Clair, September 14, 1884, *J. Macoun*.

In typical *S. uniligulata* as it grows in the bogs from Newfoundland
to New Jersey the branches or the pedicels are conspicuously hirtellous.
This typical form of the species occasionally extends inland to the
Great Lake Region but the plant above described seems to be an
extreme confined to western New York and Ontario.

SOLIDAGO ELLIOTTII T. & G., var. **divaricata**, n. var., caule 4–5 dm.
alto sparse villosa; foliis confertis ellipticis 3–6 cm. longis 1.5–2 cm.
latis subtus ad nervos sparse setosis, margine grosse crenato-serratis;
panicula foliosa 1–1.5 dm. longa 1–1.3 dm. lata, ramis divaricatis apice
recurvatis valde secundis bracteolatisque foliis amplis suffultis.

Stem 4–5 dm. high, sparingly villous: leaves crowded, elliptic,
3–6 cm. long, 1.5–2 cm. broad, sparingly setose on the nerves beneath;
the margin coarsely crenate-serrate: panicle leafy, 1–1.5 dm. long,
1–1.3 dm. broad; the branches divaricate, recurved at apex, con-
spicuously secund and bracteolate, subtended by ample leaves.—
RHODE ISLAND: meadow northeast of Fresh Pond, Block Island,
September 15, 1913, *Fernald, Long & Torrey*, no. 10,543 (TYPE in
Gray Herb.).

Very strongly simulating *S. rugosa*, var. *villosa* in its leafy inflor-
escence with widely divergent or recurved branches; but with the
involucre (5–5.5 mm. long) exactly as in *S. Elliotii*. In the slightly
villous stem and the sparingly setose nerves of the leaves also suggest-
ing *S. rugosa*, which, however, has much smaller heads.

SOLIDAGO RUGOSA Mill., var. **aspera** (Ait.), n. comb. *S. aspera* Ait.
Hort. Kew. iii. 212 (1789).

Field-experience through several seasons with this plant has con-
vinced the writer that it is better treated as an extreme variation of
S. rugosa than as a distinct species. Var. *aspera* is more abundant
southward than is typical *S. rugosa* and commonly prefers drier
habitats.

SOLIDAGO LEPIDA DC. In the region including Newfoundland and southern Labrador, the Gaspé Peninsula and northern New Brunswick and northern Maine, *Solidago canadensis* L. is less common than farther south, and *S. serotina* Ait. is unknown. Here their places are occupied chiefly by a very common goldenrod, in foliage and size of heads somewhat intermediate between those two species, but with the branches of the panicle strongly ascending or but slightly secund. In this northeastern area, centering about the Gulf of St. Lawrence, this common goldenrod, with heads much larger (involucre 3–5 mm. high) than in *S. canadensis* (involucre 2–2.8 mm. high)¹ but with the stems puberulent or minutely pilose much as in that species, is quite as variable as others of the genus, but it is possible to recognize four somewhat distinct trends of the species.

About the Straits of Belle Isle and in some parts of eastern Newfoundland the plant has broadly lanceolate to oblong coarsely serrate leaves and a short compact thyrus which is almost overtopped by the upper leaves. This plant is a good match for authentic Alaskan material and in foliage is closely matched by a fragment of the type of *Solidago lepida* DC. Prod. v. 339 (1836).

On the limestone detritus of Percé, in Gaspé County, Quebec, occurs a plant strongly resembling *S. lepida*, but with the leaves very densely cinereous-pilose. This cinereous extreme of the series has, so far as the writer can determine, received no name.

A third variant is a plant with elongate-lanceolate smoothish leaves and elongate or somewhat rhombic scarcely leafy thyrus. This plant, abounding on the gravels of the River Ste. Anne des Monts in Gaspé County, Quebec, seems quite inseparable from extreme specimens of the northwestern *S. elongata* Nutt. Trans. Am. Phil. Soc. vii. 327 (1840).

But by far the commonest trend of the species in the Northeast is a tall plant which is clearly a very large extreme of *S. elongata* with an ample panicle. Often as large but never as secund as in *S. serotina*, but with large leaves running well into the inflorescence much as in *S. rugosa*, var. *villosa* (Pursh) Fernald,² this variety, in foliage and in the long branches of the inflorescence, passes directly into *S. elongata* and in the leafy character of its panicle clearly connects with the most characteristic *S. lepida*. It occurs in good development, not only in

¹ See Fernald, RHODORA, x. 92 (1908).

² Fernald, RHODORA, x. 91 (1908).

the Northeast — from Newfoundland and Gaspé to Montmorenci County, Quebec and Aroostook County, Maine — but is found somewhat generally across the continent: in Ontario, Michigan, Saskatchewan, British Columbia, Montana, Wyoming, Utah, &c., where it has passed variously as *S. canadensis* L., *S. serotina* Ait., *S. serotina*, var. *salebrosa* Piper, and *S. elongata* Nutt.

In all their essential characters: pubescence of stem, foliage, ascending or barely recurved branches of the inflorescence, and in the texture and size of the involucre, these plants are all obviously of one species for which the earliest name is *S. lepida* DC.; but as varieties they are fairly marked and are here proposed as

S. LEPIDA DC., var. **molina**, n. var., caule 3.5–4.5 dm. alto dense cinereo-tomentuloso subviscoso; foliis confertis oblongo-lanceolatis grosse serratis supra scabris subtus dense cinereo-pilosis subviscosis; panicula erecta terminali rhomboideo 5–9 cm. longo.

Stem 3.5–4.5 dm. high, densely cinereous-tomentulose, somewhat viscid: leaves crowded, oblong-lanceolate, coarsely serrate, scabrous above, densely cinereous-pilose and somewhat viscid beneath: panicle erect, terminal, rhomboid, 5–9 cm. long.—QUEBEC: limestone detritus of Cap Barré, Percé, August 16, 1904, *Collins, Fernald & Pease* (TYPE in Gray Herb.); gravelly slopes, Les Murailles, Percé, August 17, 1904, *Collins, Fernald & Pease* (*Pease*, no. 6220).

Cited in the 7th edition of Gray's *Manual* under *S. canadensis*, var. *gilvocanescens* Rydberg, but on account of its larger involucre and dense upright panicle better placed with *S. lepida*.

S. LEPIDA, var. **elongata** (Nutt.), n. comb. *S. elongata* Nutt. Trans. Am. Phil. Soc. vii. 327 (1840).

S. LEPIDA, var. **fallax**, n. var., caule 0.5–1.5 m. alto, supra minute piloso; foliis lanceolatis vel oblanceolatis 0.5–1.5 dm. longis argute serratis acuminatis supra glabris vel plus minusve scabris, subtus ad nervos scabris; panicula erecta subcorymbiformi vel pyramidali 1–3 dm. longa, 0.7–2 dm. lata, ramis adscendentibus vix vel paulo recurvatis inferioribus foliis elongatis suffultis; involucre 3–5 mm. longo, bracteis circa 3-seriatis lineari-lanceolatis tenuibus.

Stem 0.5–1.5 m. high, minutely pilose above: leaves lanceolate or oblanceolate, 0.5–1.5 dm. long, coarsely sharp-serrate, acuminate, glabrous or more or less scabrous above, scabrous on the nerves beneath: panicle erect, somewhat corymbiform or pyramidal, 1–3 dm. long, 0.7–2 dm. wide; the branches ascending, not at all or only slightly recurved, the lower subtended by elongate leaves: involucre 3–5 mm. long; bracts about 3-seriate, linear-lanceolate, thin.—Newfoundland to British Columbia, south to northern New Brunswick, northern Maine, northern Michigan, Utah and Washington.

The following specimens are characteristic. NEWFOUNDLAND: rocky soil, base of cliff, near Topsail, Conception Bay, August 12-19, 1901, *Howe & Lang*, no. 1282; gravelly thicket, Harry's River, August 18, 1910, *Fernald & Wiegand*, no. 4108 (TYPE in Gray Herb.); damp thickets, Grand Falls, August 11, 12, & 14, 1911, *Fernald, Wiegand & Darlington*, nos. 6298, 6299, 6300. QUEBEC: gravel-beaches and bars, River Ste Anne des Monts, August 3-17, 1905, *Collins & Fernald*; alluvial woods at mouth of Bonaventure River, July 31, 1902, *Williams & Fernald*, August 4, 1904, *Collins, Fernald & Pease* (*Pease*, no. 5918); vicinity of Cap à l'Aigle, August, 1905, *J. Macoun*, nos. 68,376, 68,378; Ste Anne de Beaupré, August 30, 1905, *J. Macoun*, no. 68,375. NEW BRUNSWICK: border of woods, Four Falls, Victoria County, August 11, 1909, *Fernald*, no. 2232. MAINE: river-thicket, Fort Fairfield, August 15, 1901, *Robinson & Fernald*. ONTARIO: Onaman River, Thunder Bay District, 1912, *H. E. Pulling*. MICHIGAN: shaded ditches, Keewanaw County, October, 1887, *Farwell*, no. 491 (very pubescent). SASKATCHEWAN: *Bourgeau*, 1858. BRITISH COLUMBIA: flood plain of the Columbia at Beavermouth, August 18, 1905, *Shaw*, no. 1166. WYOMING: Snake River, August 13; 1899, *Nelson*, no. 6441. UTAH: Utah Valley, July, 1869, *Watson*, no. 562. WASHINGTON: Granville, July 18, 1902, *Conard*, no. 347; valley of Swauk River, 1913, *S. P. Sharples*, no. 238.

Passing by numerous transitions on the one hand to the more condensed typical *S. lepida*, on the other to var. *elongata* with its more elongate and more definitely terminal thyrsus. Often confused in the Herbarium with *S. serotina* Ait., which has the stems glabrous up to the inflorescence with its strongly secund branches, and the heads usually larger. In the East more often confounded with *S. canadensis* L. which has similar foliage and similarly pubescent stems, but very small heads (the involucre 2-2.8 mm. long) on strongly recurving branches. In its more pubescent extremes simulating the more southern *S. altissima* L., which has the very cinereous leaves thick and usually entire and the involucre firmer and less attenuate.

SOLIDAGO Bartramiana, n. sp., caulibus caespitosis gracilibus glabris vel supra sparsissime pilosis 2-3.5 dm. altis; foliis uniformibus lanceolato-attenuatis triplinerviis tenuibus 3-6 cm. longis 4-8 mm. latis utrinque glabris vel subtus ad nervos scabris, margine integris vel obsolete serratis scabris; panicula erecta terminali thyrsiformi vel corymbiformi 3-12 cm. longa 2-7 cm. lata, ramis arcte adscendentibus inferioribus foliis elongatis suffultis; capitulis paucis plerumque longe pedicellatis, pedicellis 7-12 mm. longis setulosis minute bracteolatis; involucre 2.5-3 mm. longo, bracteis 1-2-seriatis 10-15 lineari-attenuatis glabris tenuibus viridescentibus; ligulis circa 10; achaeniis ma-

turis 1.5–2 mm. longis hispidis; pappo 1.5–2 mm. longo, setibus basi plerumque flexuosis.

Stems caespitose, slender, glabrous or above very sparsely pilose, 2–3.5 dm. high: leaves uniform, lance-attenuate, triple-nerved, thin, 3–6 cm. long, 4–8 mm. wide, glabrous on both surfaces or scabrous on the margin beneath, entire or obsolete serrate, the margin scabrous: panicle erect, terminal, thyriform or corymbiform, 3–12 cm. long, 2–7 cm. wide; the branches strongly ascending, the lower subtended by elongate leaves: heads few, mostly long-pedicelled; the pedicels 7–12 mm. long, setulose and minutely bracteolate: involucre 2.5–3 mm. long; the bracts 1–2-seriate, 10–15, linear-attenuate, glabrous, thin, greenish: ligules about 10: mature achenes 1.5–2 mm. long, hispid: pappus 1.5–2 mm. long, the bristles usually flexuous at base.—NEWFOUNDLAND: ledges and talus, north bank of Exploits River below the falls, Grand Falls, July 22, 1911, *Fernald, Wiegand, Bartram & Darlington*, no. 6303 (TYPE in Gray Herb.).

Named for Edwin Bunting Bartram, President of the Philadelphia Botanical Club and worthy representative of a distinguished botanical name, who first detected the plant at its type-locality. *S. Bartramiana* in habit resembles *S. lepida* and its var. *fallax*, but is at once distinguished from all the varieties of *S. lepida* by its glabrous stems, long-pedicelled heads and almost uniseriate involucre. At Grand Falls *S. Bartramiana* was mature (with ripe fruit) on July 22, while at the same locality *S. lepida*, var. *fallax* was fully a month later, collected in young flowering condition the middle of August.

SOLIDAGO CANADENSIS L., var. **Harger**i, n. var., caulibus villosis; foliis lanceolatis argute serratis supra scabris subtus cinereo-puberulis.

Stems villous: leaves lanceolate, sharply serrate, scabrous above, cinereous-puberulent beneath.—Valleys of the Deerfield and Housatonic Rivers, Massachusetts and Connecticut. MASSACHUSETTS: roadside, Florida, August 27, 1904, *Ralph Hoffmann*. CONNECTICUT: roadside near the Housatonic River, at Bennett's Bridge, Southbury, October 1, 1901, *E. B. Harger* (TYPE in Gray Herb.); dry soil near the Housatonic River, Oxford, August 15, 1910, *Harger*.

This plant, specially called to my attention by Mr. E. B. Harger, is frequent in the Housatonic Valley. It has the tiny heads, characteristic inflorescence, and "triple-nerved" leaves of *Solidago canadensis* L., but differs strikingly from the typical form of that species (which has the stems glabrous or merely a little pilose except near the inflorescence and the leaves at most pilose along the nerves beneath) in having the upper half or two-thirds of the stem villous and the leaves closely cinereous-puberulent beneath as in the large-headed *S.*

altissima L. In the pubescence of the stem the plant suggests *S. rugosa* but there the resemblance ceases, for Mr. Harger's plant has the definitely "triple-nerved" leaves of *S. canadensis*. In the cinereous-puberulent lower surfaces of the leaves it is suggestive of the common western *S. canadensis*, var. *gilvocanescens* Rydberg, which is found locally as far eastward as Vermont,¹ but that variety has the stems cinereous-pulverulent or at most puberulent. The plant of the Housatonic Valley, with villous stems, which Mr. Harger reports having seen at a number of stations in Connecticut, extends northward to the Deerfield Valley in Massachusetts, and it seems to be a distinct geographic variety.

SOLIDAGO GRAMINIFOLIA (L.) Salisb., var. **septentrionalis**, n. var., caule glabro vel subglabro; foliis perviridibus lanceolatis vel oblongolanceolatis nec attenuatis apice obtusiusculis glabris vel subtus ad nervos paulo setulosis; corymbo laxo ramis lateralibus valde elongatis; capitulis plerumque glomerulatis; pedicellis paulo setulosis; involucre 4-4.5 mm. alto, bracteis apice viridibus.

Stem glabrous or nearly so: leaves deep green, lanceolate or oblong-lanceolate, not attenuate, bluntish, glabrous or beneath a little setulose on the nerves: corymb loose, the lateral branches conspicuously elongate: heads mostly glomerulate: pedicels a little setulose: involucre 4-4.5 mm. high; bracts green at tip.—NEWFOUNDLAND: ledges, talus and gravel, north bank of Exploits River below the falls, Bishop Falls, July 28, 1911, *Fernald, Wiegand & Darlington*, no. 6305, and Grand Falls, August 12, 1911, no. 6306 (TYPE in Gray Herbarium); and gravelly railroad embankment, Grand Falls, August 14, 1911, no. 6307. QUEBEC: gravelly beach of St. John (or Douglstown) River, Gaspé County, August 23, 1904, *Collins, Fernald & Pease*.

The representative of the continental *S. graminifolia* in central Newfoundland and the Gaspé Peninsula, differing strikingly in foliage from the typical form of the species which has the narrower leaves long-attenuate to sharp tips and the corymb ordinarily much denser, with branches of more uniform length. In the outline of its leaves var. *septentrionalis* suggests the western var. **camporum** (Greene), n. comb., = *Euthamia camporum* Greene, *Pittonia*, v. 74 (1902); but that plant has the firmer leaves light green, the corymb comparatively dense and the involucre pale throughout. In the green-tipped involucre var. *septentrionalis* suggests var. **polycephala** (Fernald), n. comb., = *S. polycephala* Fernald, *RHODORA*, x. 93 (1908); *Euthamia floribunda* Greene, *Pittonia*, v. 74 (1902), not *S. floribunda*

¹ Proctor, Vermont, *W. W. Eggleston* in Gray Herb.

Phil. Anal. Univ. Chil. lxxxvii. 430 (1894). But this apparently local plant of New Jersey, eastern Pennsylvania and Maryland has the leaves long-attenuate, the pedicels copiously setulose, and the involucre only 3–3.5 mm. high, and seems to be a small-headed extreme nearest allied to var. *Nuttallii* (Greene) Fernald.

ASTER johannensis, n. sp., caule solitario gracile 4 dm. alto glabro; foliis oblanceolatis utroque attenuatis acuminatis basi subcordatis supra scabris subtus glabris margine remote serratis, mediis 6–8 cm. longis 1–1.2 cm. latis: pedicellis paucis (3–5) monocephalis 5–9 cm. longis 3–5 foliis parvis instructis involucre hemisphaerico 7–8 mm. alto, bracteis valde 2–3-seriatis herbaceis anguste linearibus 0.7–1 mm. latis apice subulatis; ligulis violaceis 1–1.3 cm. longis anguste linearibus; pappi setis 1-seriatis barbellulatis; achaeniis setosis.

Stem solitary, slender, 4 dm. high, glabrous: leaves oblanceolate, narrowed to both ends, acuminate, at base subcordate, scabrous above, glabrous beneath, the margin remotely serrate; the median 6–8 cm. long, 1–1.2 cm. wide: pedicels few (3–5) monocephalous, 5–9 cm. long, provided with 3–5 small leaves: involucre hemispherical, 7–8 mm. high; the bracts obviously 2–3-seriate, herbaceous, narrowly linear, 0.7–1 mm. wide, subulate at apex: ligules violet, 1–1.3 cm. long, narrowly linear: pappus-bristles 1-seriate, minutely barbellate: achenes setose.—QUEBEC: near Ouatchouan Falls, Lake St. John, August 19, 1904, *W. F. Wight*, no. 228 (TYPE in Gray Herb.).

Related to *A. junceus* Ait., but with larger heads, much more herbaceous but subulate-tipped involucre bracts, and broader coarsely serrate leaves. In its involucre exactly matching the western *A. Fremonti* Gray, but clearly distinct in its nearly uniform and serrate cauline leaves.

ASTER FOLIACEUS Lindl. In extreme eastern British America and northern New England the difficulties of clearly distinguishing the large-headed Asters of the section *Vulgares* (*A. novi-belgii* L., *A. longifolius* Lam., etc.) are further complicated by the abundance of a plant which in some characters differs from the ordinarily recognized eastern Asters. This heretofore little recognized eastern plant abounds in the river-valleys and on the damp mountain slopes of Newfoundland, southern Labrador, and eastern Quebec, extending westward to Portneuf County, Quebec and southward to northern Maine and northern New Hampshire. Its chief characters separating it from *A. novi-belgii* and *A. longifolius* are its very few large heads (involucre, excluding the enlarged outer bracts, 7–9 mm. high) chiefly

solitary on elongate pedicels which are naked or have 1 or 2 large dilated foliaceous bracts, and the essentially equal herbaceous or foliaceous involucre bracts. This plant with few long-pedicel heads is quite as variable as other species of its affinity, but in spite of its great variability it holds within the Hudsonian and Canadian area indicated the characters above defined and seems to be a pronounced trend such as is ordinarily considered a species in the genus *Aster*. The lower plants from alpine, subalpine and more northern habitats, with the "short monocephalous branches leafy about the heads,"¹ exactly coincide with authentic material from the original Alaskan localities of *A. foliaceus* Lindl.; while in some colonies the plants are an exact match for the original specimens of the Rocky and Cascade Mountain var. *frondeus* Gray, having the tall stems bearing "ample" leaves 1-1.5 dm long and 2-3.5 cm. broad and many of the heads on long almost erect naked or nearly naked pedicels (often 5-15 cm. long). One of the eastern variants with foliage as in var. *frondeus* departs from that variety in its loosely arching pedicels; another strongly suggests the original Parry specimens (no. 417) from Colorado of var. *Parryi* Gray but differs from that little known plant in its more uniform foliage; another variant from the Gaspé coast with short crenate leaves and nearly uniformly leafy pedicels and outer involucre bracts, is an extreme departure from the others and simulates none of the western varieties known to the writer, while a fourth tendency, from western Newfoundland, has the unusually small heads mostly in pairs at the tips of the pedicels and the involucre almost lacking the enlarged foliaceous outer bracts.

These four undescribed northeastern varieties are so pronounced in their characters as to merit special designation as

A. FOLIACEUS Lindl., var. **arcuans**, n. var., caule 0.6-1 m. alto superne flexuoso; foliis tenuibus rhomboideo-lanceolatis acuminatis remote serratis, mediis 1-2 dm. longis 2-3.5 cm. latis; ramis pedicellisque laxe arcuato-ascendingibus, pedicellis 3-9 cm. longis monocephalis efoliatis vel remote cum 1-3 foliis oblongis instructis; involucre 8-10 mm. alto, bracteis lanceolatis herbaceis vel exterioribus foliaceis elongatisque.

Stem 0.6-1 m. high, flexuous above: leaves thin, rhombic-lanceolate, acuminate, remotely serrate; the median 1-2 dm. long, 2-3.5 cm. wide; branches and pedicels loosely arcuate-ascending; the pedicels 3-9 cm. long, monocephalous, naked or remotely provided with

¹ Gray, Syn. Fl. i., pt. 2, 193 (1884).

1-3 oblong leaves: involucre 8-10 mm. high, with the bracts lanceolate or with the outer foliaceous and elongate.—QUEBEC: alluvium of the St. John (or Douglstown) River, Gaspé County, August 23, 1904, *Collins, Fernald & Pease* (TYPE in Gray Herb.); alluvial thickets and woods near the mouth of Dartmouth River, Gaspé County, August 26 & 27, 1904, *Collins, Fernald & Pease*; alluvium of York River, Gaspé County, July 29, 1905, *Williams, Collins & Fernald* (transitional to var. *frondeus*).

Resembling var. *frondeus* but differing in its more serrate leaves and in the much more spreading or arching branches and pedicels.

A. FOLIACEUS, var. **crenifolius**, n. var., caule 2.5-3.5 dm. alto; foliis crassis ellipticis basi apiceque angustatis subobtusis crenatis subtus pilosis, mediis 4.5-8 cm. longis 1.7-2.5 cm. latis; ramis pedicellisque subadscendentibus; pedicellis 1-3 cm. longis monocephalis foliis oblongis crenatis instructis; involucre 8-10 mm. alto, bracteis exterioribus foliaceis oblongis.

Stem 2.5-3.5 dm. high; leaves thick, elliptic, narrowed to base and apex, bluntish, crenate, pilose beneath; the median 4.5-8 cm. long, 1.7-2.5 cm. wide: branches and pedicels subascending; pedicels 1-3 cm. long, monocephalous, provided with oblong crenate leaves: involucre 8-10 mm. high, with the outer foliaceous bracts oblong.—QUEBEC: recent clearing near the mouth of Grand River, Gaspé County, August 11-15, 1904, *Collins, Fernald & Pease* (TYPE in Gray Herb.).

In habit somewhat intermediate between the typical form of the species and var. *arcuans*; differing from both in the very crenate leaves and the uniform leafiness of the pedicels.

A. FOLIACEUS, var. **subpetiolatus**, n. var., caule 3-7 dm. alto glabro vel piloso; foliis patentibus vel subadscendentibus subcoriaciis glabris anguste rhomboideo-ovatis longe acuminatis basi angustatis remote serratis vel subintegris, mediis late subpetiolatis 1-1.5 dm. longis 2-4 cm. latis; ramis subadscendentibus; pedicellis plerumque 1.5-4 cm. longis monocephalis efoliatis vel apice cum foliis elongatis acuminatis instructis; involucre 8-10 mm. alto, bracteis lanceolato-attenuatis exterioribus plus minusve foliaceis.

Stem 3-7 dm. high, glabrous or pilose: leaves spreading or somewhat ascending, subcoriaceous, glabrous, narrowly rhombic-ovate, long-acuminate, narrowed at base, remotely serrate or subentire; the median broadly subpetioled, 1-1.5 dm. long, 2-4 cm. wide: branches subascending: pedicels mostly 1.5-4 cm. long, monocephalous, leafless or with elongate acuminate leaves at apex: involucre 8-10 mm. high, with lance-attenuate bracts, the outer more or less leafy.—QUEBEC: crests of sea-cliffs, Grand River, Gaspé County, August 11-15, 1904, *Collins, Fernald & Pease* (TYPE in Gray Herb.); calcareous shingle at base of Cap Tourelle, and gravel by Ruisseau Patate,

Tourelle, August 19–21, 1905, *Collins & Fernald*; springy coniferous woods along "Low's Trail," at base of Table-top Mountain, August 14, 1906, *Collins & Fernald*, no. 738; banks of Becscie River, Anticosti, July 31, 1883, *J. Macoun*, no. 7.

Somewhat simulating *A. foliaceus*, var. *Parryi* Gray, but that plant, as represented by the original Parry material from Colorado, has the strongly ascending leaves smaller and rapidly decreasing to the summit, and the corymb much less leafy than in var. *subpetiolatus*, which in its extreme form suggests some forms of the smaller-headed *A. tardiflorus* L.

A. FOLIACEUS, var. **subgeminatus**, n. var., caule 2.5–5 cm. alto, glabro; foliis adscendentibus ellipticis vel anguste elliptico-ovatis longe acuminatis basi subpetiolaribus serratis, mediis 7–12 cm. longis 1.5–2.5 cm. latis; ramis pedicellisque perbrevibus arcte adscendentibus, pedicellis plerumque apice 2-cephalis; involucre 5–6 mm. alto, bracteis oblanceolatis chartaceis apice valde herbaceis.

Stem 2.5–5 cm. high, glabrous; leaves ascending, elliptic or narrowly elliptic-ovate, long-acuminate, with subpetiolar base, serrate; the median 7–12 cm. long, 1.5–2.5 cm. broad: branches and pedicels very short, strongly ascending, the pedicels usually terminated by 2 heads: involucre 5–6 mm. high; its bracts linear-oblanceolate, chartaceous, conspicuously herbaceous at tip.—NEWFOUNDLAND: damp bushy ravine in the limestone tableland, altitude 200–300 m., Table Mountain, Port-à-Port Bay, August 16, 1910, *Fernald, Wingand & Kittredge*, no. 4126.

In foliage strongly resembling vars. *Parryi* and *subpetiolatus*, in habit like typical *A. foliaceus*, but distinguished from all the described varieties in its small usually paired heads and in the absence of the outer foliaceous bracts. In foliage also suggesting *A. tardiflorus* L. (unknown in Newfoundland) but readily distinguished by its broader and firmer involucre bracts and by the very few short erect pedicels. Material from the valley of Harry's River (no. 4120) strongly simulates var. *subgeminatus*, but has the involucre with more foliaceous outer bracts.

ASTER anticostensis, n. sp., caule solitario 4 dm. alto, subflexuoso glabro; foliis coriaceis lineari-lanceolatis utroque attenuatis basi subcordatis margine integris scabris, mediis 1.2–1.6 dm. longis 1 cm. latis; ramis arcte adscendentibus, pedicellis plerumque 2–5 cm. longis monocephalis efoliatis vel 1–2 foliis instructis: involucre hemisphaerico 1 cm. alto, bracteis valde imbricatis 3–4-seriatis, oblongis 1.5–2 mm. latis duris vel subcoriaceis flavescentibus apice subherbaceis; ligulis violaceis circa 1.5 cm. longis; pappo 1-seriato setis barbellatis; achaeniis setosis.

Stem solitary, 4 dm. high, subflexuous, glabrous: leaves coriaceous, linear-lanceolate, attenuate to both ends, the base subcordate, the margin entire scabrous; the median 1.2–1.6 dm. long, 1 cm. wide: branches strongly ascending; pedicels mostly 2–5 cm. long, 1-headed, leafless or with 1 or 2 leaves: involucre hemispherical, 1 cm. high; the bracts strongly imbricated in 3–4 series, oblong, 1.5–2 mm. wide, hard or somewhat leathery, yellowish, subherbaceous at tip: ligules violet, about 1.5 cm. long: pappus 1-seriate, the setae barbellate: achenes setose.—QUEBEC: river banks and grassy slopes, Jupiter River, Anticosti, July 20, 1880, *J. Macoun*, no. 6 (TYPE in Gray Herb., distributed as *A. paniculatus*).

A puzzling plant, in its monocephalous elongate pedicels simulating *A. foliaceus* but with very slender elongate leathery leaves like those of extreme *A. longifolius*. In the involucre, with its very broad firm bracts strongly imbricated, unlike any Eastern *Aster*, but somewhat suggesting some extreme specimens referred to the North-western *A. Douglasii* Lindl. In habit and involucre *A. anticostensis* strongly suggests the subarctic *A. spathulatus* Lindl., but that little-known plant has spatulate-oblongate leaves and the involucre less imbricated. When better known the two may be found to have closer affinities than are at present evident.

ASTER PUNICEUS L., var. **perlongus**, n. var., caule tenui hispido 4–5.5 dm. alto; foliis tenuibus sublucidis utrinque glabris lineari-lanceolatis vel -oblanceolatis acuminato-attenuatis basi valde cordato-amplexicaulibus minute serratis vel subintegris, mediis 1–2 dm. longis 1.2–2.2 cm. latis; ramis brevibus; involucri bracteis lineari-attenuatis laxis.

Stem slender, hispid, 4–5.5 dm. high: leaves thin, somewhat lustrous, glabrous on both sides, linear-lanceolate or -oblanceolate, acuminate-attenuate, strongly cordate-clasping at base, minutely serrate or subentire; the median 1–2 dm. long, 1.2–2.2 cm. wide: branches short: involucre with loose linear-attenuate bracts.—QUEBEC: springy spots in coniferous forest along "Low's Trail," altitude about 675 m., western base of Table-top Mountain, Gaspé County, August 14, 1906, *Fernald & Collins*, no. 737 (TYPE in Gray Herb.).

A very distinct extreme in its exceedingly slender and thin almost entire leaves.

ERIGERON HYSSOPIFOLIUS Michx., var. **villicaulis**, n. var., humilis 5–15 cm. altus vix caespitosus; caulibus simplicibus vel subsimplicibus pedicellis dense villosis; foliis plus minusve villosis longe ciliatis.

Low, 5–15 cm. high, scarcely caespitose: the simple or subsimple stems and the pedicels densely villous: leaves more or less villous,

long-ciliate.—NEWFOUNDLAND: dry exposed ledges and shingle on the limestone tableland, altitude 200–300 m., Table Mountain, Port à Port Bay, July 16 & 17, 1914, *Fernald & St. John*, no. 10,866 (TYPE in Gray Herb.).

A very extreme variant of the common little *Erigeron hyssopifolius* of slaty and calcareous gravels and damp ledges in the Canadian and Hudsonian districts. Ordinarily (and in Michaux's type material) the taller branching and densely tufted stems and the pedicels are glabrous or only sparingly pilose and the otherwise glabrous leaves are at most sparingly short-ciliolate on the margin and midrib.

ARNICA pulchella, n. sp., rhizomate 2–4 cm. longo horizontali vel suberecto; caule solitario 1–1.8 dm. alto villosa, pilis albidis ad 2 mm. longis cum glandulis stipitatis minutis mixtis; foliis imis lanceolatis vel oblanceolatis 3–15 cm. longis 5–12 mm. latis acutiusculis apice calloso mutico basi in petiolos marginatos angustatis utrinque glandulosis laxe villosisque pilis 1–1.5 mm. longis, margine integris vel remote callosodentatis; foliis caulinis 1–2 jugis, inferioribus lanceolatis 2–4.5 cm. longis glandulosis villosisque apice calloso mutico, superioribus multo minoribus linearibus vel lanceolatis 1–3 cm. longis apice saepe linearitenuato scarioso; capite 1 pulchro 4.5 cm. diametro: involucre circa 1.5 cm. alto basi dense villosa supra glanduloso laxe villosoque; bracteis 8–10, anguste rhomboideis 3–3.5 mm. latis a medio ad apicem longe attenuatum tenuem angustatis; ligulis circa 10 luteis, lamina 1.3–1.5 cm. longa 7–8 mm. lata valde 7–9-nervata dorso strigosa apice argute 3–4-dentata, dentibus longioribus 3–5 mm. longis; achaeniis 6–7 mm. longis hirsutis; pappo circa 7 mm. longo albo, setibus barbelatis.

Rhizome 2–4 cm. long, horizontal or suberect: stem solitary, 1–1.8 dm. high, villous especially above; the white hairs up to 2 mm. long, mixed with minute stipitate glands: basal leaves lanceolate or oblanceolate, 3–15 cm. long, 5–12 mm. wide, acutish with a blunt callous tip, narrowed to margined petioles, glandular and loosely villous on both surfaces (the hairs 1–1.5 mm. long), margin entire or remotely callous-dentate: cauline leaves 1 or 2 pairs; the lower lanceolate, 2–4.5 cm. long, glandular and villous, with a blunt callous tip; the upper much reduced, linear or lanceolate, 1–3 cm. long, often with a linear-attenuate scarious appendage at tip: heads solitary, very handsome, 4.5 cm. broad; involucre about 1.5 cm. high, densely villous at base, glandular and loosely villous above; bracts 8–10, narrowly rhombic, 3–3.5 mm. broad, tapering from the middle to a long-attenuate thin tip: rays about 10, orange-yellow; the oblong-ovate blade 1.3–1.5 cm. long, 7–8 mm. broad, conspicuously 7–9-nerved, strigose on the back, the apex sharply 3–4-toothed, the longest teeth 3–5 mm. long: achenes 6–7 mm. long, hirsute: pappus about

7 mm. long, white; the bristles barbellate.—NEWFOUNDLAND: dry exposed ledges and shingle on the limestone tableland, altitude 200–300 m., Table Mountain, Port à Port Bay, July 16 & 17, 1914, *Fernald & St. John*, no. 10,874 (TYPE in Gray Herb.).

Intermediate between *Arnica alpina* (L.) Olin & Ladan of the Arctic and of northern Labrador and *A. tomentosa* J. M. Macoun of the Canadian Rocky Mountains. In *A. alpina*, which *A. pulchella* resembles in the shape and the tips of the leaves, the pubescence of the leaves and the lower half of the stem is very sparse and short, the involucre consists of 15–20 narrower less pubescent bracts; and the narrower rays are much less cleft, the blunter lobes being 1–2 mm. long. In the northwestern *A. tomentosa* the basal leaves are thicker than in *A. pulchella*, more prominently nerved and blunter, and covered with much longer pubescence; the upper leaves lack the slender apical appendage which is present in well developed *A. pulchella*; the pubescence of the stem and the involucre is very much longer and more copious (almost lanate); the bracts of the involucre are bluntish or merely acute; and the thicker and less prominently nerved rays have a longer pubescence on the back.

HIERACIUM CANADENSE Michx., var. **hirtirameum**, n. var., caule 2–8 dm. alto villosu-hirsuto vel infra glabrescente; foliis inferioribus ciliatis subtus plus minusve hirsutis; ramis pedicellisque gracilibus valde adscendentibus vel subfastigiatis copiose longe hirsutis, pilis 1.5–3 mm. longis cum glandulis minutis mixtis; involucre campanulato-hemisphaerico 5–10 mm. longo; bracteis circa 3-seriatis fuscis, exterioribus glanduloso-hirsutis.

Stems 2–8 dm. high, villous-hirsute or below glabrescent: lower leaves ciliate, more or less hirsute beneath: branches and pedicels slender, strongly ascending or somewhat fastigiate, copiously long-hirsute; the trichomes 1.5–3 mm. long, mixed with minute glands: involucre campanulate-hemispheric, 5–10 mm. long: bracts about 3-seriate, fuscous; the outer glandular-hirsute.—NEWFOUNDLAND: clearings and borders of thickets, Clarendville, August 19 & 20, 1911, *Fernald & Wiegand*, no. 6437; ledges, talus and gravel, north bank of Exploits River below the falls, Bishop Falls, July 28, 1911, *Fernald, Wiegand & Darlington*, no. 6433 (TYPE in Gray Herb.); dry, rocky clearing, Grand Falls, July 25, 1911, *Fernald, Wiegand, Bartram & Darlington*, no. 6432. QUEBEC: damp calcareous ledges and cliffs, between Baldé and Baie des Chaleurs, Bonaventure River, August 5–8, 1904, *Collins, Fernald & Pease*; damp ledges and cliffs, Little Cascapedia River, July 29 & 30, 1904, *Collins, Fernald & Pease*; ledgy banks of

Restigouche River, Matapedia, July 19, 1904, *Fernald*. MAINE: shaded bank of St. John River, Allagash, August 11, 1893, *Fernald*; wooded bank of St. John River, Van Buren, September 18, 1900, *Fernald*; rocky island in Penobscot River, Upper Stillwater, September 18, 1899, *Fernald*.

A puzzling plant, in its characteristic development very different from the commonly larger *H. canadense*, but presenting numerous perplexing transitions. The variety seems to be more inclined than the species to an aberrant development (possibly pathological) in which the branches become shortened and crowded among the reduced upper leaves, the heads in these aberrant individuals becoming very numerous and tiny (with involucre only 2 or 3 mm. long).

II. SOME ANOMALOUS SPECIES AND VARIETIES OF BIDENS IN EASTERN NORTH AMERICA.

M. L. FERNALD AND HAROLD ST. JOHN.

In 1909 a peculiar *Bidens* was found on the tidal flats of Winnegance Creek, near the mouth of the Kennebec River in Maine, and at that time identified¹ with the northern *B. hyperborea* Greene, which was already known from James Bay and the estuaries of streams entering the Gulf of St. Lawrence. Subsequently the Maine plant has been found not only along Winnegance Creek, but on the tidal reaches of the Androscoggin at Topsham and Brunswick. Although in its erect outer involucre bracts it strongly simulates *B. hyperborea*, the plant of the lower Androscoggin and Kennebec shows many characters which indicate that its affinity is more nearly with *B. Eatonii* Fernald of the tidal flats of the Merrimac River. In *B. hyperborea* the heads are slenderly cylindric-campanulate; the chaff dark-striate; the achenes consistently 4-awned and many-striate, the inner nearly or quite 1 cm. long. In the plant of the lower Androscoggin and Kennebec the heads are turbinate-hemispherical, the chaff pale, often inconspicuously striate; the achenes consistently 2-awned, the inner 6 mm. long; and ordinarily the primary leaves more acuminate at tip

¹ Fernald & Wiegand, RHODORA, xii. 120, 144 (1910).

and with more numerous teeth. In its nearest relative, *B. Eatoni*, the leaves are all slender-petioled, the heads slender-cylindric, the inner involucre in well developed heads 1–1.5 cm. long, the chaff dark-striate, and the achenes usually 4-awned, the inner ones 7–9 mm. long and scarcely or only faintly striate; while in the plant from Maine the upper leaves are sessile, the inner involucre of well developed heads 5–8 mm. long, and the achenes are copiously channeled.

In its foliage and in the breadth of the larger heads the plant from the lower Androscoggin and Kennebec closely simulates extreme slender forms of *B. cernua* L., but that species has the nodding heads depressed-hemispherical in outline with a nearly flat base, the outer foliaceous bracts spreading, the chaff dark-striate, and the 4-awned achenes strongly 4-angled at summit and tuberculate on the angles. In the Maine plant, however, the erect heads have somewhat turbinate involucre, with erect outer foliaceous bracts, and the 2-awned achenes are flat and without tuberculate hairs.

Differing in all its essential characters from the three species which it most nearly resembles, the plant from the estuary of the Kennebec and Androscoggin Rivers seems to be another of the localized estuary species comparable with *B. bidentoides* (Nutt.) Britton, known only from the estuary of the Delaware, *B. Eatoni* Fernald, known only from the estuary of the Merrimac, and *B. hyperborea* Greene of the river-estuaries entering the Gulf of St. Lawrence and James Bay. The Maine plant we propose as

BIDENS colpophila, n. sp., glaberrima subcarnosa; caule erecto 1–4 dm. alto simplice vel ramoso, ramis arcte adscendentibus; foliis oblanceolato-acuminatis; imis subpetiolatis; mediis superioribusque sessilibus 0.5–1 dm. longis 6–13 mm. latis remote serratis, serris utrinque 3–10; capitulis erectis; involucreo turbinato-hemisphaerico, bracteis exterioribus foliaceis arcte adscendentibus glabris lineari-lanceolatis acutis vel subacutis 1.5–4 cm. longis, bracteis interioribus oblongis subacutis flavis badeo-striatis; paleis anguste oblongis flavis obsolete pallideque striatis; achaeniis anguste cuneatis planis utrinque valde circa 9-striatis retrorse setosis 2(rarissime 3)-aristatis, aristis 2.5–3 mm. longis retrorse barbatis, achaeniis exterioribus 5 mm. longis, interioribus 6 mm. longis.

Strictly glabrous and somewhat fleshy: stem erect, 1–4 dm. high, simple or branched; the branches strongly ascending: leaves oblanceolate; the lower subpetiolate; the middle and upper sessile, 0.5–1 dm. long, 6–13 mm. wide, remotely serrate, the teeth 3–10 on each side: heads erect: involucre turbinate-hemispherical; the outer foliaceous bracts strongly ascending, glabrous, linear-lanceolate, acute or sub-

acute, 1.5–4 cm. long; interior bracts oblong, subacute, yellow, brown-striate: pales narrowly oblong, yellow, obscurely pale-striate: achenes narrowly cuneate, flat, conspicuously about 9-striate on each side, retrorsely setose, 2(very rarely 3)-awned; the awns 2.5–3 mm. long, retrorsely barbed; outer achenes 5 mm. long, inner 6 mm. long.—MAINE: among sedges and rushes of a salt marsh, and at tide limit at edge of marsh, Winnegance Creek, Phippsburg, August 23, 1909, *Fernald & Wiegand* (*Fernald*, nos. 2248 & 2249 — TYPE in Herbarium of the New England Botanical Club); Cow Island, Topsham, August, 1910, *Kate Furbish*; bank of Androscoggin River, Brunswick, August 13, 1911, *C. H. Bissell*.

Bidens frondosa, as it ordinarily occurs, has the teeth of the leaves broadly deltoid, usually as broad at the base as the total length, and the foliaceous bracts of the involucre rarely twice as long as the inner bracts. Occasionally plants occur with more slender teeth or with longer outer bracts, but these two extreme tendencies are rarely if ever found in combination in the continental range of the species. In Newfoundland, however, the only indigenous colonies yet known of *B. frondosa* have the teeth of the leaves very narrowly lance-attenuate, and the foliaceous bracts 2.5–4 times as long as the inner involucre; and on Prince Edward Island and the Magdalen Islands this same combination of characters occurs in plants of the natural swales and marshes, indicating that in this area, at least, the species has departed sufficiently from its more general tendencies to merit the separation of a geographic variety,

B. FRONDOSA L., var. **stenodonta**, n. var., dentibus foliorum lanceolato-attenuatis, mediis 5–6 mm. longis; bracteis foliaceis involucri lanceolatis acuminatis plerumque 2.5–5 cm. longis.

Teeth of the leaves lance-attenuate; the median 5–6 mm. long: the foliaceous bracts of the involucre lanceolate, acuminate, usually 2.5–5 cm. long.—NEWFOUNDLAND, boggy open woods, Whitbourne, August 8, 1911, *Fernald & Wiegand*, no. 6375 (TYPE in Gray Herbarium); wet thickets, Norris Arm, August 21, 22, 1911, *Fernald & Wiegand*, no. 6376. QUEBEC: boggy margin of a brackish pond southwest of Étang du Nord village, Grindstone Island, Magdalen Islands, August 15, 1912, *Fernald, Long & St. John*, no. 8199. PRINCE EDWARD ISLAND: border of salt marsh, Bunbury, August 9, 1912, *Fernald, Long & St. John*, no. 8202.

In 1913 attention was directed to a peculiar plant of the Magdalen Islands which was then identified with *Bidens tripartita* L. of Eurasia and of the Gaspé Peninsula of Quebec, and to a variety of the Magdalen

Island plant common upon Prince Edward Island and characterized by having upwardly barbellate awns. The latter was then proposed as *Bidens tripartita*, var. *heterodoxa* Fernald.¹

Subsequent collections and a more detailed study of the plants of Prince Edward Island and the Magdalens show that, although strongly simulating *Bidens tripartita* in foliage and in the flat usually 2-awned achene, the plant of these islands differs from that characteristic European species in having much smaller and copiously pubescent achenes and in having the outer foliaceous bracts of the involucre glabrous or at most very remotely ciliate toward the base. In *B. tripartita*, on the other hand, the much larger achenes are strictly glabrous and the outer involucre bracts conspicuously ciliate to the tip. The plant from the Gulf of St. Lawrence in its outer involucre bracts closely resembles the more southern, normally 4-awned *B. connata* Muhl., and occasional specimens with three or four awns tend to strengthen this similarity. In *B. connata*, however, the midribs of the two faces of the achene become strongly thickened at summit, thus giving to the top of the achene an obviously 4-angled appearance; and the surfaces of the achene are ordinarily quite glabrous or at most remotely setulose. In the plant of the Magdalen Islands and Prince Edward Island the copiously pubescent achenes are quite as flat as in *B. tripartita* and *B. comosa* (Gray) Wiegand. For this reason we feel justified in considering the insular plant a distinct species which is related on the one hand to *B. tripartita* (which is definitely known in North America only from the Gaspé Peninsula), on the other to the common continental species, *B. connata*.

B. heterodoxa (Fernald), n. comb. *B. tripartita* L., var. *heterodoxa* Fernald, RHODORA, xv. 76 (1913). Caule tenui glabro 1.5–9 dm. alto; foliis simplicibus vel 3–5-partitis utrinque glabris, imis tenuiter petiolatis, lamina vel loba terminali lanceolata vel anguste ovata 2.5–12 cm. longa argute grosseque serrata; capitulis discoideis vel radiatis; involucri bracteis foliaceis 3–6 lineari-lanceolatis elongatis, basi glabris vel sparse ciliatis, bracteis interioribus oblongis obtusis stramineis atro-striatis 7–9 mm. longis; paleis linearibus 4-striatis; achaeniis planis strigosis 2–4-aristatis margine aristisque sursum barbellatis, marginalibus cuneatis 4.5 mm. longis 1.8 mm. latis cum aristis 1.5 mm. longis coronatis, interioribus 6–7 mm. longis vix 2 mm. latis aristas 2–3 mm. longas gerentibus.

The stem slender, glabrous 1.5–9 dm. high: leaves simple or 3–5-parted, glabrous on both surfaces; the lower slender-petioled; blade

¹ RHODORA, xv. 76 (1913).

or terminal lobe lanceolate or narrowly ovate, 2.5–12 cm. long, sharply and coarsely serrate: heads discoid or radiate: involucre with 3–6 linear-lanceolate elongate foliaceous bracts, glabrous at base or sparsely ciliate; interior bracts oblong, obtuse, straw-colored, black-striped, 7–9 mm. long: pales linear, 4-striped: achenes flat, strigose, 2–4-awned, the margin and awns upwardly barbellate; marginal cuneate, 4.5 mm. long, 1.8 mm. wide, with awns 1.5 mm. long; interior 6–7 mm. long, scarcely 2 mm. wide, the awns 2–3 mm. long.— Besides the stations originally cited the following may be noted. PRINCE EDWARD ISLAND: border of fresh pond (recently an arm of the sea) back of sand hills, Tracadie, August 22, 1914, *Fernald & St. John*, no. 11,210 (radiate form). QUEBEC: sandy sea strand at the Narrows, Alright Island, Magdalen Islands, August 21, 1912, *Fernald, Long & St. John*, no. 8317 (broad leaved form with 4 awns).

B. HETERODOXA, var. **orthodoxa**, n. var., aristis achaeniorum retrorse setosis.

Awns of the achene retrorsely barbed.— QUEBEC: shallow water near the margins of brackish ponds, southwest of Étang du Nord village, Grindstone Island, Magdalen Islands, August 15, 1912, *Fernald, Long & St. John*, no. 8203 (TYPE in Gray Herbarium); boggy margin of strand at the Narrows, Alright Island, August 21, 1912, *Fernald, Long & St. John*, no. 8204.

In characteristic *Bidens connata* Muhl. the blades of the middle cauline leaves or the terminal lobes of the divided leaves have 10–20 sharp serrations on each margin, and the outer foliaceous bracts of the involucre are linear or linear-oblongate and inconspicuous, usually not more than 2 mm. broad and but slightly exceeding the inner involucre. On Block Island occurs a characteristic extreme in which the primary leaves are coarsely and irregularly dentate with 5–10 teeth on each margin and with the outer foliaceous bracts as large as in *B. comosa* (Gray) Wiegand, usually oblongate, the larger 3–6 cm. long and 0.5–1.5 cm. broad. A plant quite identical with this Block Island extreme has been collected by Mr. E. F. Williams at Lake Massapoag in Sharon, Massachusetts, indicating that the plant is of somewhat wide distribution in southern New England. This extreme plant with achenes as in *B. connata*, but with foliage and involucre similar to those of *B. comosa* may be called

B. CONNATA Muhl., var. **fultior**, n. var., foliis primariis laminis vel lobis terminalibus grosse inaequaliterque dentatis, dentibus utrinque 5–10; involucri bracteis foliaceis oblongatis, majoribus 3–6 cm. longis 0.5–1.5 cm. latis; aristis achaeniorum 4–6.— MASSACHUSETTS: Lake Massapoag, Sharon, September 10, 1899, *E. F. Williams*. RHODE

ISLAND: sandy pond-margins, east of Dickens Point, Block Island, September 15, 1913, *Fernald, Long & Torrey*, no. 10,688 (TYPE in Gray Herbarium).

Bidens cernua L. as it occurs in eastern America is highly variable and especially so in its foliage. Besides the typical form of the species with elongate-lanceolate or linear-lanceolate leaves with many coarse serrations, we get the dwarf bog plant, var. *minima* (Huds.) DC., with tiny, spatulate or oblanceolate petioled leaves and usually solitary campanulate heads; and the very large varieties with broader copiously serrate leaves, varieties *elliptica* and *integra* of Wiegand. On the brackish sands of the Magdalen Islands and Prince Edward Island occurs a depressed or matted, freely branching plant with the heads and achenes and the hispid stems of *B. cernua*. The small, fleshy leaves, however, are mostly obtuse and with few and obscure dentations, and the outer fleshy bracts of the involucre are oblong or broadly oblanceolate and much exceeding the inner series. This little plant, though first noted in maritime sands, does not seem to be restricted to brackish habitats, for identical material has been collected on the sandy shore of a pond in Coös County, New Hampshire, and an old specimen of Gray's from western New York is probably not separable. This extreme variation may be called

B. CERNUA L., var. **oligodonta**, n. var., humilis plus minusve depressa ramosissima 0.5–2 dm. alta; caulibus glabris vel sparse hispidis; foliis crassis rhomboideis vel elliptico-oblanceolatis obtusis ad basim angustatis subintegris vel paucè dentatis, dentibus utrinque 1–5 obtusis, foliis primariis 2–5 cm. longis 0.5–1.5 cm. latis; capitulis hemisphaericis 0.5–1 cm. latis; bracteis foliaceis oblongis vel late oblanceolatis obtusis plerumque 1.5–2 cm. longis.—QUEBEC: peaty margin of a brackish pond southwest of Étang du Nord wharf, Grindstone Island, Magdalen Islands, August 22, 1912, *Fernald, Long & St. John*, no. 8208 (TYPE in Gray Herbarium). PRINCE EDWARD ISLAND: wet brackish sand, North Lake, Kings County, August 24, 1912, *Fernald, Long & St. John*, no. 8209. NEW HAMPSHIRE: sandy shore, Success Pond, Coös County, August 27, 1907, *A. S. Pease*, no. 10,738. NEW YORK: western section, *Gray*.

III. AN INSULAR VARIETY OF *SOLIDAGO SEMPERVIRENS*.

HAROLD ST. JOHN.

Our common Seaside Golden-rod, *Solidago sempervirens*, was described by Linnaeus in 1753.¹ His brief characterization applies well to the plant of our northern Atlantic coast, known by him to occur in Canada and New York. He mentioned the "corymbose-panicled flowers," and the "lanceolate, subfleshy, glabrous, but slightly scabrous-margined leaves." His sources of information were: Gron. virg. 97; Corn. canad. 168; Herm. flor. 26; Moris. hist. 3. p. 124. f. 7. t. 23. f. 15; Pluk. alm. 389. t. 235. f. 5.

Of these the work of Jaques Cornut is the earliest and his description and full-page plate are by far the clearest. As the greater part of the description by Linnaeus was drawn from Cornut, we can safely turn to this fuller definition for more points about the species which Linnaeus characterized under the new name *sempervirens*.

Cornut's plate shows several sparsely branched stems arising from the rootstock. The radical leaves are wanting, the cauline are subsessile, lanceolate, tapering equally to either end and gradually diminishing in size to the base of or into the inflorescence, which is a loose panicle.

If we turn to the dried specimens in the Gray Herbarium and that of the New England Botanical Club we find *Solidago sempervirens* well matching Cornut's plate from the shores of the Gulf of St. Lawrence and along the coast to New Jersey, and less commonly to Florida. Along the southern part of our coast, from New Jersey southward, *S. sempervirens* is usually displaced by *S. stricta* Ait. and its variety *angustifolia* (Ell.) Gray.

In the Botany of California² Gray credits *S. sempervirens* to the Pacific coast, characterizing it in these words: "Leaves rather fleshy, lanceolate, entire, the uppermost reduced to subulate bracts of the virgate and rather dense panicle, Salt marshes near San Francisco, Bolander. Near the southern boundary, 60 miles east of San Diego, Palmer. Appears to be the same as the Salt-Marsh

¹ L. Sp. Pl. ii. 878 (1753).

² Bot. Calif. i. 319 (1876).

Goldenrod of the whole Atlantic shore down to Mexico. It is a form with small heads (3 lines long), approaching *S. angustifolia* of Elliott.”

The interpretation that the plant of the Pacific coast is *S. sempervirens* has now become traditional,¹ but the descriptions of the plant seem to tally exactly with that of *S. confinis* Gray.² This species is separated from *S. sempervirens* on the character, “rays small, not surpassing the disc flowers.” In *S. confinis* as in *S. sempervirens* the cauline leaves are divergent, gradually diminishing upward, but the leaves of the former are much narrower, being linear or lance-linear in outline. In the discussion following the description of *S. confinis* Gray cites one of the records he had formerly given for *S. sempervirens* in California: “*S. sempervirens*, Gray, Bot. Calif. i. 319, as to coll. Palmer.” The other sheet cited by Gray in the Botany of California: “*Solidago sempervirens* L. Marsh, San Francisco, California, H. N. Bolander, 2249, 1866/7,” seems to be typical of the plants since described as *S. sempervirens* in Behr’s, Greene’s, and Jepson’s works. This plant is also *S. confinis*. From this it appears that the presence of *S. sempervirens* on the Pacific coast of North America has yet to be demonstrated.

Among the numerous names reduced by Gray³ to synonyms of *S. sempervirens* L. is *S. azorica* Hochst.⁴ In its flower and fruit characters this plant of the Azores is inseparable from *S. sempervirens* L. but the cauline leaves, on the other hand, are strikingly different in outline. They are sessile, ovate or deltoid-lanceolate, broadest just above the base, and tapering gradually into the blunt, attenuate tip. This may be recognized as

SOLIDAGO SEMPERVIRENS L., var. **azorica** (Hochst.), n. comb. *S. azorica* Hochst. in Seubert, Fl. Azorica, 31, t. X (1844).

Contrasting with this the North American *S. sempervirens* has the cauline leaves linear to broadly lanceolate, widest near the middle and tapering equally to either end.

¹ Behr, Fl. Vicin. San Francisco, 85 (1888); Greene, Flora Franciscana, 373 (1897); and Jepson, Fl. W. and Middle Calif. 476 (1911).

² Gray, Syn. Fl. N. Am. i. pt. 2, 149 (1884).

³ Gray, Proc. Am. Acad. xvi. 192 (1882).

⁴ Hochst. in Seub. Fl. Azorica, 31, t. x (1844).